



# **New Hampshire Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide January 2015**



# ACKNOWLEDGEMENTS AND DISCLAIMERS

The New Hampshire Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide (Guide) was prepared by the New Hampshire Office of Energy and Planning, GDS Associates, Inc. and Resilience Planning & Design, through the New England Solar Cost-Reduction Partnership, a project of the U.S. Department of Energy (DOE) SunShot Initiative Rooftop Solar Challenge II<sup>1</sup> under award number DE-EE0006305 issued to the Clean Energy States Alliance (CESA). The New England Solar Cost-Reduction Partnership is working to reduce the costs of rooftop solar deployment across five New England states by targeting non-hardware solar “soft” costs.

This Guide was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

The material provided in this Guide is not intended to replace or supplant existing state or federal codes or regulations. There are no warranties associated with the use of this information. Some of this material, which is/was believed to be accurate at the time of publication, may no longer be accurate, current, or comply with existing codes and regulations. Neither the authors nor any other organizations or individuals who have contributed to this Guide are accountable for the use or misuse of information obtained herein. The views expressed in this Guide are not necessarily the views of the entire project team, the state of New Hampshire or contributors of information to the project and Guide.

The GDS Associates Team along with Resilience Planning & Design would like to acknowledge the following organizations and individuals who provided valuable insights and input throughout the data collection and document development phases of this effort; the New Hampshire Office of Energy and Planning, the New Hampshire Public Utilities Commission, New Hampshire building energy code officials, the cities of Berlin, Concord, Keene and Nashua, the Southern New Hampshire Planning Commission multiple New Hampshire Local Energy Committee and Commission members (including the towns of Bow, Derry, Hancock, Greenland, Jaffrey, Lancaster, the City of Manchester, Milford, Pembroke, Sharon, Windham, and Wolfboro), Liberty Utilities, Public Service Company of New Hampshire, New Hampshire Electric Cooperative, and Unitil Energy Services, solar PV installers including Frase Electric, Revision Energy, RGS Energy, Seacoast Energy, and Smart Energy NE, Plymouth Area Renewable Energy Initiative (PAREI) and the New Hampshire Sustainable Energy Association (NHSEA). A special thank you goes to Connecticut’s Clean Energy Finance and Investment Authority, now the Connecticut Green Bank, for its generosity in sharing The Connecticut Rooftop Solar PV Permitting Guide produced by EnergizeCT, and for granting permission to utilize any and all text from that document that might be useful to New Hampshire.

---

<sup>1</sup> For more information on the SunShot Initiative, visit: <http://energy.gov/eere/sunshot-initiative>. For more information on the Rooftop Solar Challenge, see: <http://www.eere.energy.gov/solarchallenge/>.

## TABLE OF CONTENTS

Acknowledgements and Disclaimers .....	ii
I. Introduction .....	1
Potential benefits of utilizing the resources in this Guide .....	1
Process steps.....	2
Guide results and resources.....	3
II. Current Laws, Regulations and Codes that Impact Rooftop Solar PV .....	4
Laws, Regulations, Codes and Zoning .....	4
1. New Hampshire Building Code Requirements .....	4
2. Planning and Zoning Laws .....	5
3. Homeowners Association Restrictions.....	7
4. Solar Access Laws.....	7
5. Relevant State Policies.....	7
6. Zoning Regulations.....	8
Current Municipal Permits & Fees .....	9
1. Permits .....	9
2. Fees.....	10
3. Potential Permitting Barriers.....	11
4. Zoning.....	11
Utility Interconnection Rules .....	13
III. Residential Rooftop Solar PV Strategies .....	14
Make Permitting Information Available.....	14
1. Review and document the existing permitting process .....	14
2. Provide resources on Municipal websites.....	15
Simplify Permit Application, Submission, Review and Inspection Processes.....	15
1. Permit Application .....	15
2. Permit Submission .....	16
3. Review and Inspection Processes .....	17
Understand NH's Residential Solar PV Electric Utility Interconnection Requirements .....	20
Pursue Training and Other Resources.....	22
Sample Permit Checklist .....	Appendix A
Sample Permit Application for NH Residential Solar PV .....	Appendix B
Sample Electrical One Line Drawing .....	Appendix B-1
Sample One Line Site Plan Drawing .....	Appendix B-2
Sample Solar PV Attachment Detail Drawing .....	Appendix B-3
Sample Structural Review Worksheet .....	Appendix C
Simplified NH Electric Utility Interconnection Requirements .....	Appendix D

# I. INTRODUCTION

As New Hampshire residents seek to become more energy independent, reduce electricity costs, and take steps toward meeting our clean energy goals, demand for solar energy systems in our communities will continue to increase.<sup>2</sup> Solar PV is a clean energy technology that creates electricity from the sun. Clean energy systems have many local benefits including reduced energy costs and increased energy security. Small scale energy projects also enhance New Hampshire's economy, as installation of these projects creates jobs that are difficult to outsource and money spent on the projects circulates within the state's economy. Throughout this effort, input was sought from municipal leaders and staff, solar photovoltaic (PV) installers and industry leaders, utility representatives, property owners and other stakeholders to identify New Hampshire-specific policies, practices, barriers and strategies for reducing barriers to solar PV installations. The goal of this Guide is to suggest ways to reduce solar costs and make solar more affordable and accessible.

The purpose of this New Hampshire Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide is to provide useful resources for town administrators, code officials, homeowners and PV system installers. The Guide first provides an inventory of existing statewide and municipal laws, regulations and codes relevant to residential solar PV. To determine current adoption of the various regulations at the municipal level, data was gathered through the OEP's Annual Municipal Survey and interviews with the cities of Berlin, Concord, Keene and Nashua. Survey data was supplemented through various outreach efforts, including a review of a recent Southern New Hampshire Planning Commission Wind/Solar Renewable Energy Community Survey.<sup>3</sup>



## POTENTIAL BENEFITS OF UTILIZING THE RESOURCES IN THIS GUIDE

Based on research and stakeholder input, this Guide provides a number of suggestions intended to reduce soft costs associated with installing residential solar electric. The potential benefits for municipalities, homeowners and installers to adopting the tools and guidance are:

- \* Streamlined permit process, saving municipal staff and contractors time.
- \* Submission of "complete" permit applications by contractors, again saving contractors and staff time.
- \* Access to resource materials and tools to increase knowledge and understanding of residential solar PV permitting, zoning, installation and interconnection processes.

---

<sup>2</sup> *New Hampshire 10-Year State Energy Strategy*, prepared for NH Office of Energy & Planning, September 2014 (see recommendations 12.C and 12.D).

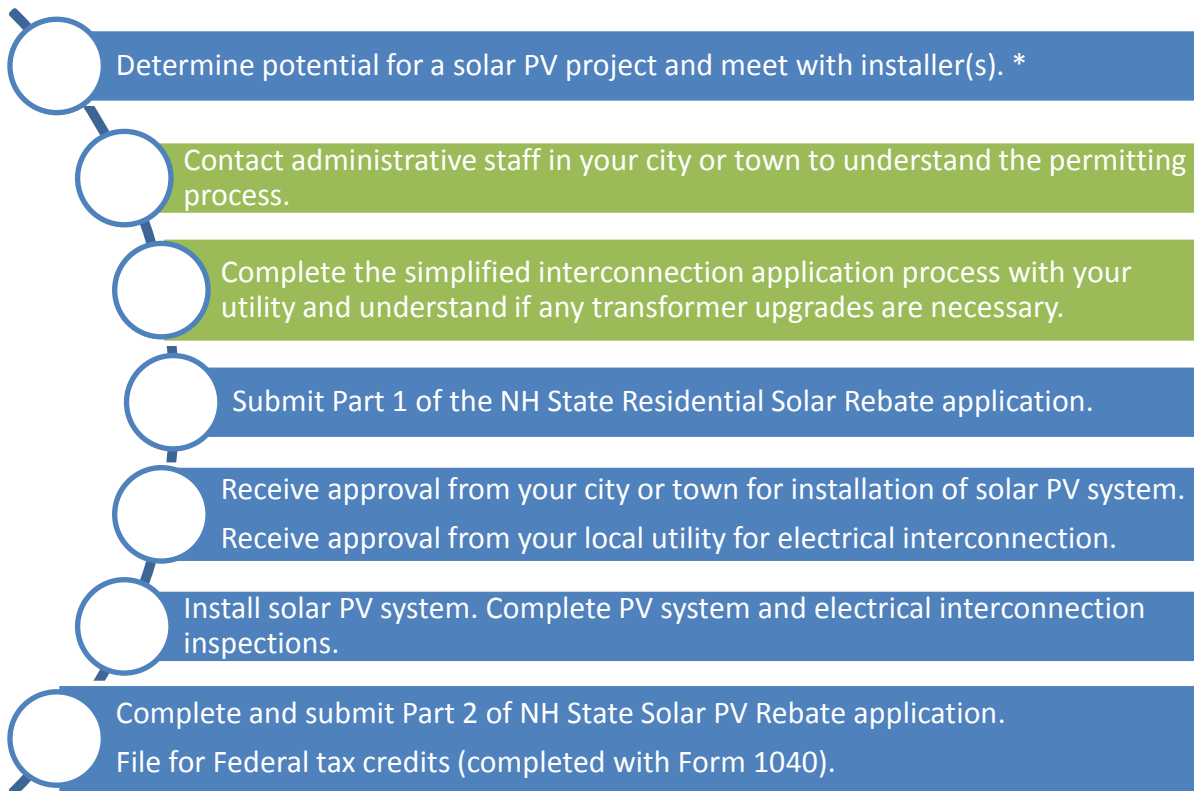
<sup>3</sup> *Wind/Solar Renewable Energy Community Survey Summary Report*, prepared by the Southern NH Planning Commission, October 2014.



- \* Availability of online forms which can be customized to meet a municipality's needs.
- \* Identification of system components and standards to guide inspections of residential solar PV systems to ensure they are installed properly and safely in your community.
- \* Improved resiliency of communities through increased energy security and decreased energy costs for residents.
- \* More residential solar PV installed in your community.
- \* Support of local businesses.
- \* More energy dollars remain in the state.

## PROCESS STEPS

The process of designing and installing a grid-tied rooftop solar PV system includes many important steps for homeowners and contractors. The process also includes filing with the utility for electrical interconnection permission, applying for rebates and other financial credits, and coordinating with town staff to understand and effectively navigate the permitting process. Although these steps may be completed in a different order based on a project's unique circumstances, this Guide focuses on providing guidance, detailed information and suggestions related to steps two and three that are in the green boxes below.



\* As with any significant purchase, shop around when considering purchasing a solar PV system. Gather as much information as possible, check contractor references and obtain multiple quotes.

## GUIDE RESULTS AND RESOURCES

When developing this guidance document, two facilitated stakeholder meetings were conducted in October and November of 2014 yielding valuable information as to the challenges and barriers which municipalities, residential customers and installers face when pursuing solar PV implementation. A review of existing models from other states was also conducted to identify key components applicable to New Hampshire. Given the grant's focus on creating consistency at the regional level, New Hampshire's Guide draws from Rooftop Solar PV Permitting Guides developed by Energize Connecticut and Massachusetts, under the U.S. Department of Energy's Rooftop Solar Challenge I grant.

The result of these efforts is the development of this Guide which provides information and tools. The Guide provides information on current laws, regulations and codes that impact rooftop solar PV. It also includes guidance for possible process improvements in the areas of zoning, permitting, inspections and structural review. The tools and sample forms in the Appendices are designed to simplify residential solar PV approval and installation processes. Though this Guide focuses primarily on residential rooftop solar PV, inclusion of considerations for free-standing (ground mounted) residential solar PV systems are provided where possible. The sample forms presented in this Guide may be customized to meet your municipality's needs.

The Guide also presents a summary of the utility interconnection (net metering) and application/approval process for customer-owned residential solar PV, inverter-based and other renewable generation projects up to 100 kW. These requirements exist to ensure the continued safety and protection of both the homeowner's PV system and the utility's electrical grid.

The Guide is available for download on the OEP website at <http://www.nh.gov/oep/>, and is structured as follows:

- ✱ Overview of current laws, regulations and codes that impact rooftop solar PV
- ✱ Residential solar PV zoning and permitting recommendations and resources:
  - Sample Permit Checklist
  - Sample Permit Application and Drawings
  - Sample Structural Review Worksheet
- ✱ Overview of NH's electric utility interconnection process
- ✱ Additional information resources for municipalities and others

## II. CURRENT LAWS, REGULATIONS AND CODES THAT IMPACT ROOFTOP SOLAR PV

The development of residential rooftop solar PV in New Hampshire is impacted by several state statutes and building code requirements. These laws provide the framework for municipal regulations that impact solar development, including structural/electrical requirements for solar PV systems, land use regulations, and solar PV permit fees. This section outlines the major rules and regulations that affect solar PV in New Hampshire.

### LAWS, REGULATIONS, CODES AND ZONING

#### 1. NEW HAMPSHIRE BUILDING CODE REQUIREMENTS

The State Building Code applies throughout the state in all cities and towns. However, RSA 155-A:2V allows towns and cities, as well as counties and village districts that have planning and zoning authority, to adopt building codes that are stricter than the State Building Code.<sup>4</sup> The current New Hampshire State Building Code can be found on the NH Department of Safety Building Code Review Board website.<sup>5</sup> It is important to note that not all communities enforce a code, and not all communities have staff.



**The 2009 (current) State Building Code includes the following model national and international codes for one- and two-family dwellings:**

- ✱ 2009 NFPA 101 Life Safety Code Chapter 24 as amended by N.H. Admin. Rule Saf-C 6000 and NFPA 1.
- ✱ State Fire Code Saf-C 60000 and specific subcodes.
- ✱ 2009 International Existing Building Code (IEBC).
- ✱ 2009 International Plumbing Code (IPC) with NH Amendments.
- ✱ 2009 International Mechanical Code (IMC) with NH Amendments.
- ✱ 2009 International Energy Conservation Code (IECC) with NH Amendments.
- ✱ 2009 International Residential Code (IRC) with NH Amendments.<sup>6</sup>

---

<sup>4</sup> See also NH RSA 674:51 and RSA 674:51-a.

<sup>5</sup> <http://www.nh.gov/safety/boardsandcommissions/bldgcode/>.

<sup>6</sup> The following sections of the International Residential Code include relevant structural requirements for solar PV systems: Chapter 8 Section 802.2 "Design and Construction," Section 802.3 "Framing Details," 802.5 "Allowable Rafter Spans," and Section 802.6 "Bearing" (particularly

- ✱ 2014 National Electrical Code (NEC) with NH Amendments (NFPA 70)<sup>7</sup>

The NH State Building Code includes the International Energy Conservation Code (IECC), which governs energy efficiency requirements for new residential and commercial construction. The 2009 International Residential Code (IRC) contains requirements for building strength and storm preparedness, and the 2011 National Electrical Code also contains requirements for solar PV. The New Hampshire Building Code Review Board is currently reviewing the 2015 editions of the International Codes for possible adoption. Codes under review include the International Building Code, International Residential Code, International Mechanical Code, International Plumbing Code, International Energy Conservation Code and International Existing Building Code.

### ***Did you know?***

*Specific provisions of municipal building codes that are more stringent than the State Building Code are available in the town and city offices that have adopted them.*

## **2. PLANNING AND ZONING LAWS**

New Hampshire has several state statutes that establish a basis for municipal land use regulations, including the development of solar energy systems. Local governments can enact solar-friendly ordinances and zoning regulations as long as they do not contradict the state enabling statutes. The following state statutes impact solar PV systems and sustainable development in New Hampshire.

- ✱ **NH RSA 72:62** permits municipalities to adopt an exemption from the assessed value, for property tax purposes, for persons owning real property which is equipped with a solar energy system.
- ✱ **NH RSA 477** allows municipalities to enact planning and zoning regulations that protect access to energy sources and that encourage the use of solar skyspace easements.
- ✱ **NH RSA 477:51** contains model language for such solar easements that can be used in the case a property owner wants to pursue the option.
- ✱ **NH RSA 672:1, I and III-a** recognize that planning and zoning regulation is the responsibility of local government, but declares a statewide interest in regulations to encourage energy efficient development patterns, including adequate access to direct sunlight for solar energy uses, and declare that installation of solar and other renewable energy systems shall not be unreasonably limited by the use of municipal zoning power or by the “unreasonable interpretation” of such powers except where necessary to protect the public health, safety, and welfare.
- ✱ **NH RSA 672:1, III-d** clarifies that “unreasonable interpretation” of municipal zoning ordinances includes failure of municipal authorities to recognize that renewable energy systems are accessory uses and that

---

Table 802.5.1 (3) Rafter Spans for Common Lumber Species (Ground snow load=30 psf, ceiling not attached to rafters, L// = 180). Additionally, Chapter 23 of the International Building Code contains wind uplift guidelines in Section 2308.10.1 “Wind Uplift.”

<sup>7</sup> Section 690 of the National Electrical Code contains information pertinent to solar PV <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=70>.



prohibition of such accessory uses cannot be inferred from an ordinance that does not specifically address such uses.

- ✱ **NH RSA 674:16 (New Hampshire's Zoning Enabling Act)** enables municipalities to adopt zoning regulations that promote the health, safety and general welfare of the community.
- ✱ **NH RSA 674:17** enables municipalities to adopt zoning ordinances designed to, among other purposes, encourage installation of solar and other renewable energy systems and to protect access to energy sources by the regulation of orientation of streets, lots and buildings, establishment of height and setback requirements, limitation on height and setback of vegetation, and encouragement of the use of solar skyspace easements.
- ✱ **NH RSA 674:36, II-k** enables municipalities to regulate the subdivision of land to encourage the installation and use of solar and other renewable energy systems and to protect access to energy sources by the regulation of orientation of streets, lots and buildings, establishment of height and setback requirements, limitation on height and setback of vegetation, and encouragement of the use of solar skyspace easements.
- ✱ **NH RSA 674:2, III-n** enables municipalities to include an energy section in their master plans that, among other issues, includes a policy statement on energy conservation.
- ✱ **NH RSA 674:46-a and RSA 674:44-b** enable municipalities that have duly established historic districts to enact regulations to preserve historic buildings, but require these regulations to be compatible with the municipality's master plan and zoning ordinance.
- ✱ **NH RSA 674:51, III-d** allows municipalities to establish a schedule of fees within the municipal building code, or to authorize the governing body to establish such fees. Municipalities may also include provisions to waive permit fees, or institute a flat nominal fee for renewable energy systems.



New Hampshire municipalities could consider utilizing these statutes as a foundation for planning and zoning regulations that make installation of solar PV easier. For example, solar-friendly regulations could allow for flexibility with respect to zoning restrictions that impact installation of solar energy systems, whether rooftop or free-standing. Some examples of zoning elements that impact solar PV development are height restrictions, setback restrictions, lot coverage restrictions, impervious surface requirements and historic district regulations.

### **3. HOMEOWNERS ASSOCIATION RESTRICTIONS**

Homeowners Associations are often formed when residential developments include private roads, recreational areas or other common lands that are maintained by the Association. Membership of those purchasing property in the development is usually required. The bylaws of these private organizations often include restrictions or other rules governing the appearance and use of the residential properties within the development. These restrictions are in addition to any municipal planning and zoning regulations that may apply, and may include height and setback rules or other restrictions that could impact the installation of rooftop or free-standing solar PV equipment.

Homeowners Associations are incorporated under state statutes, and incorporation forms are filed with the New Hampshire Secretary of State. The Associations are governed by a Board of Directors, which is usually elected by the membership (property owners). The Board of Directors votes to adopt the Association's bylaws, to which each property owner should receive a copy or have access. Bylaws may be amended from time to time and Association members may request the Board of Directors consider amendments. The bylaws usually include provisions governing the process to be followed for adopting and amending bylaws.

### **4. SOLAR ACCESS LAWS**

New Hampshire enabling statutes allow municipalities to enact planning and zoning regulations that protect access to energy sources and that encourage the use of solar skyspace easements in accordance with NH RSA 477. Solar rights are the rights to access and harness sunlight. Solar access laws can protect solar rights by assuring adequate access to direct sunlight for a solar energy system (including protection from physical obstructions on adjacent properties) and by protecting the ability to install solar energy systems on residential or commercial properties that are subject to restrictions (both public and private). The NH RSA 477:51 contains model language for such solar easements that can be used in the case a property owner wants to pursue the option.

### **5. RELEVANT STATE POLICIES**

#### **5.1. RENEWABLE PORTFOLIO STANDARD (RPS)**

New Hampshire's RPS statute RSA 362:-F requires each electricity provider to meet customer load by purchasing or acquiring certificates representing generation from renewable energy based on total megawatt-hours supplied. New Hampshire's RPS statute divides renewable energy sources into four separate classes that include "Class II" sources of generating facilities that produce electricity from solar technologies and began operation after January 1, 2006.<sup>8</sup>

The Renewable Energy Fund (REF) was created in 2007 as a component of the RPS statute. Each year electric service providers comply with the law by acquiring Renewable Energy Certificates, or RECs, representing electricity generated from renewable sources. One REC equals one megawatt of generation. Electric service providers can meet their RPS obligations by obtaining sufficient quantities of RECs for a given compliance year, or by making Alternative Compliance Payments (ACPs). ACPs provide the funding for the Renewable Energy Fund, the purpose of which is to support thermal and electrical renewable energy initiatives.<sup>9</sup>

---

<sup>8</sup> [http://www.puc.state.nh.us/sustainable%20Energy/Renewable\\_Portfolio\\_Standard\\_Program.htm](http://www.puc.state.nh.us/sustainable%20Energy/Renewable_Portfolio_Standard_Program.htm).

<sup>9</sup> <http://www.puc.nh.gov/Sustainable%20Energy/RenewableEnergyFund.html>

The Renewable Energy Fund, administered by the New Hampshire Public Utilities Commission, distributes funds through rebate programs or competitive grant solicitations. The REF currently operates three rebate programs.

- The residential solar hot water rebate program.
- The residential central wood pellet heating system rebate program.
- The commercial and industrial rebate program.

#### 5.2. NET METERING

New Hampshire Code of Administrative Rules, Chapter PUC 900, establishes requirements for net metering of customer-owned renewable energy generation resources of 1,000 kilowatts or less. This rule allows solar PV owners to receive credit or a payment for net excess generation.<sup>10</sup>

#### 5.3. GROUP NET METERING

New Hampshire has also established group net metering, also known as virtual net metering. This law (RSA 362-A:9, XIV) permits net-metered renewable energy facilities, known as hosts, to share the proceeds from surplus electricity generation with other electric utility account holders, known as group members. Group members do not have net metered renewable energy facilities and do not have to make any changes to their existing electric service, but can share in the output of a renewable system on another property.<sup>11</sup>

### 6. ZONING REGULATIONS

None of the communities reviewed for this Guide had zoning regulations banning the installation of rooftop solar PV systems on residential structures. Most of the municipalities allow this type of renewable energy system to be installed on existing residential structures throughout the community, providing that a permit is granted.

However, when solar PV equipment is to be installed on the ground of a residential property adjacent to an existing structure, or on a proposed structure, setbacks and other zoning related requirements may come into play. For example, the Town of Hampton has an ordinance that focuses on limiting the aesthetic impact of solar panels.<sup>12</sup>

Communities that have created Historic Districts may have regulatory provisions that could impact solar installations. However, the number of communities in New Hampshire with such provisions appears to be quite small.

For multi-family residential developments and residential condominiums that may require site plan approval at the municipal level, there may be a need for a proposed solar PV installation to be submitted through that site plan review process at the planning board level. Some of this will be determined based on how the municipality interprets the regulatory process and how the development was approved. Another factor will be if the array being installed is for a single unit or part of a larger installation for the entire development. Outside the municipal process, but related to this additional level of approval, are Homeowners Associations and condominium associations. Each creates their own bylaws and sets limits on what can happen to the exterior of the structure.

---

<sup>10</sup> <http://www.puc.nh.gov/Regulatory/Rules/PUC900.pdf>.

<sup>11</sup> <http://www.puc.state.nh.us/Sustainable%20Energy/GroupNetMetering.html>.

<sup>12</sup> <http://hamptonnh.gov/wp-content/uploads/Building/Forms/ZONING-ORDINANCE-2013.pdf>.

# CURRENT MUNICIPAL PERMITS & FEES

## 1. PERMITS

Each of New Hampshire's 234 municipalities defines its own approach to regulating the installation of solar PV, so there is not a statewide standardized application process or fee structure. Larger communities are generally more likely to have a solar PV permitting application process and fees, while many smaller or more rural communities do not have a defined process and may not require a permit. Communities which do have a unique permit for solar PV projects most commonly require a building permit and/or electrical permit. Residential roof-mounted solar PV, ground-mounted solar PV and solar thermal systems are typically subject to the same regulations, although ground-mounted systems may trigger additional requirements such as a zoning review and setbacks from property boundaries.

Code officials across the state are increasingly involved with permitting solar PV projects, which may include responding to inquiries about the permitting process, reviewing project documentation, conferring with the installer or licensed professional applying for a permit, inspecting installed solar PV systems, and making a determination about the need for structural evaluation and reporting by a registered design professional.

### Examples of Permitting Requirements in New Hampshire Cities and Towns:

- ✱ **Andover, NH** – a stand-alone solar-specific permit with a \$50 flat fee.
- ✱ **Berlin, NH** – requires a building permit and an electrical permit at a cost of \$10 each.
- ✱ **Concord, NH** – requires a building permit and an electrical permit. The permit fee is calculated based on the overall cost of the solar PV array. The biggest concern in Concord is with older homes that are already non-conforming and may not be able to handle additional loading; therefore, an assessment by a structural engineer may be required.
- ✱ **Keene, NH** – requires only a building permit. The fee is a minimum of \$75, plus a calculation based on the construction cost (\$8 per thousand).
- ✱ **Madbury, NH** – requires an electrical permit and a fee of \$25.
- ✱ **Nashua, NH** – uses a combined land use/building permit and requires an electrical permit. The cost of permitting is \$25 for the land use component, \$35 for the building permit, and \$58 for the electrical permit. The permits include a requirement that roof system details be submitted, and as a result, the City requires involvement by an engineer on a case-by-case basis.
- ✱ **Plymouth, NH** – solar PV systems check the “other” box on building permit and pay a \$25 permit fee.

## 2. FEES

NH RSA 674:51, III-d allows municipalities to establish a schedule of fees within the municipal building code, or to authorize the governing body to establish such fees. Municipalities may also include provisions to waive permit fees, or institute a flat nominal fee for renewable energy systems.

New Hampshire's permit fees for solar PV projects are relatively low. The fee for permitting a residential rooftop solar PV system in many New Hampshire communities is typically at or below \$50, with sometimes higher fees in larger communities.

Permit fees are commonly based either on the PV system's installed value, or simply a flat or fixed amount. A valued-based permit methodology charges a fee based on the value (invoice price) of the installed system thus, driving up the cost of solar PV systems as their costs increase. Some New Hampshire communities have chosen to adopt simple, low, flat fees for solar PV permits as a way to encourage the installation of clean energy projects.

Other municipal permitting requirements that impact the cost of permitting a residential solar PV system may include the need for a structural evaluation by a structural engineer or other qualified licensed professional, a requirement that a licensed professional electrician appear in person to file the permit, and a requirement that the installer return to the installation for the code official's final inspection.

### Example of Project Soft Costs:

Here is an example of the soft costs incurred for one professional installation. These figures were provided by a New Hampshire solar PV installer and show how the permitting and inspection costs may play out in a New Hampshire community with value-based permitting – they are not meant to be representative of typical permitting costs for residential solar PV systems in the State.

Sample Permit Costs for a \$20,000 residential rooftop array:

- \* \$200 Building Permit (\$10 per \$1,000)
- \* \$100 Electrical Permit (\$5 per \$1,000)
- \* \$500 Structural Analysis and Professional Engineer's (PE) stamp
- \* \$150 Installer Office labor (compiling and submitting permit materials)
- \* \$300 Installer Labor costs (Licensed professional required to pick up permit in person, and return for final inspection)

\$1,250 in associated permitting costs = 6.25% of project cost.



### 3. POTENTIAL PERMITTING BARRIERS

Impacts of permitting barriers, including the time required of solar installers to identify, gather, and submit the necessary documentation (which can vary by town), can add confusion and increase total project costs often by \$300 to \$500 or more.

- ✱ Value-based permit fees generally drive up soft costs more than low flat fees. While municipalities need revenue to cover their costs for providing administrative and overall permit review and verification/inspection, moving to a flat fee that does not exceed municipalities' related costs may help to reduce project soft costs.<sup>13</sup>
- ✱ Requiring a licensed electrician to appear in person to file the permit impacts project soft costs. It is important to note that, although applicable code requires a licensed electrician to be involved in the installation of a solar array, it does not require that the licensed electrician personally complete and submit the necessary paperwork. Many installers can delegate this task to support staff and reduce project soft costs. This is consistent with some New Hampshire communities that require written verification by a license holder that named staff can obtain permits.
- ✱ Require multiple permits for solar PV (i.e. building and electrical) can also lead to increased installer time and coordination required to obtain the permits. The project is often individually explained to staff in multiple departments and multiple inspections are sometimes necessary.<sup>14</sup>
- ✱ Post-installation inspections involving installers are often required, but arranging the final inspection with installers can be challenging for local officials. The travel time needed for the installer to return to the site and the time needed to coordinate schedules with the local code official often add to project cost.
- ✱ Requiring that a structural engineer or other Registered Design Professional (RDP) provide structural evaluation of the proposed project appears to be the biggest factor impacting its permitting soft costs and complexity. When the installer is not aware of such a requirement, this may delay the project and add unexpected expense (\$500 on average for engineering review). Installers should communicate with their local building official prior to committing to the project to understand if an engineer is needed or not.

### 4. ZONING

Municipal planning and zoning regulations can impact a homeowner's ability to install a solar PV system. Municipal zoning typically classifies solar PV systems as "accessory structures" and they are subject to the same regulations which apply to any other structure in that category (e.g. a garage or shed). This is often more of an issue for ground mounted arrays than it is for roof



---

<sup>13</sup> In cases where there are currently no fees, or where fees do not cover costs, this report is not advocating for adding or increasing fees.

<sup>14</sup> All contractors (not just solar PV installers) work with this same issue and it comes down to scheduling. Many communities ask for 24 hours notice for inspections.

mounted arrays. In some cases, zoning regulations restrict the location of a solar PV system and prevent it from being located in a way that would be most efficient or even prevent a PV system from being installed altogether. In New Hampshire, zoning is not currently a large barrier to residential rooftop solar PV installations. However, zoning laws are subject to change and can become more restrictive. Following are a few strategies to guide future zoning ordinances away from being overly restrictive for residential rooftop solar PV.

- ✱ **Exempt rooftop installations from zoning review** – Consider exempting all residential rooftop solar PV installations (or those meeting certain criteria) from zoning review. If your jurisdiction’s Planning and Zoning Department does conduct an administrative review for residential solar PV systems, consider waiving any fee associated with this review. Solar PV projects usually pay a building and/or electrical permit fee and additional review may be required. These can add significant cost to solar PV projects.
- ✱ **Exempt or allow increased flexibility from zoning requirements for solar energy systems** – Consider creating exemptions or increasing flexibility for residential solar energy systems with respect to height, setback, lot coverage and impervious surface limitations. Ground mounted residential solar energy systems are usually categorized as accessory structures, and if so, the jurisdictions’ limitations for accessory structures should be reviewed to determine which limitations make sense for residential solar PV and which can be unnecessarily restrictive.
- ✱ **Establish requirements for historic and village district installations** – NH RSA 674:46-a and RSA 674:44-b enable municipalities that have duly established historic districts to enact regulations to preserve historic buildings, but requires these regulations to be compatible with the municipality’s master plan and zoning ordinance.
  - A municipality could enforce NH RSA 674:46-a and RSA 674:44-b by developing clear prescriptive standards for when residential solar PV is allowed in a historic district. For example, consider allowing flush mounted solar panels on existing roofs, installation of roof-mounted solar panels not visible from the street, and permitting ground mounted solar systems of limited height to be approved with only a no-cost administrative review. Though prescriptive standards can help streamline approval for projects meeting specific criteria, the standards should allow projects that meet the state requirement of “do not substantially impair the historic character of the district.” For examples of prescriptive standards for solar PV in historic districts see the National Trust for Historic Preservation’s Design Guidelines for Solar Installations,<sup>15</sup> the National Alliance of Preservation Commission’s Sample Guidelines for Solar Systems in Historic Districts<sup>16</sup> or NREL’s Implementing Solar PV Projects on Historic Buildings and in Historic Districts.<sup>17</sup>
- ✱ **Consider implementing incentive-based green building ordinances or ordinance provisions** – to award points, incentives or bonuses (such as density bonuses) to developers who include energy features such as

---

<sup>15</sup> <http://www.preservationnation.org/information-center/sustainable-communities/buildings/solar-panels/design-Guidelines-for-solar.html#.UvpXqFKUP4Y>

<sup>16</sup> <http://www.preservationnation.org/information-center/sustainable-communities/buildings/solar-panels/additional-resources/NAPC-Solar-Panel-Guidelines.pdf>

<sup>17</sup> <http://www.nrel.gov/docs/fy11osti/51297.pdf>

solar systems and solar access in their projects. For more information and resources on the planning and zoning aspects of solar PV look at the American Planning Association’s (APA) “Solar Briefing Papers,”<sup>18</sup> specifically “Integrating Solar Energy into Local Development Regulations,” as well as the APA’s Info Packet “Planning and Zoning for Solar Energy,”<sup>19</sup> a compilation of ordinances from around the country that provide examples of zoning regulations for solar.

## UTILITY INTERCONNECTION

### RULES

NH Public Utilities Commission Rule 900: Net Metering for Customer-Owned Renewable Energy Generation Resources of 1,000 Kilowatts or Less, establishes interconnection requirements for safety, reliability and power quality for net energy metering consistent with the legislative declaration of purpose set forth in RSA 362-A:1 – see PUC 901.01.<sup>20</sup> A simplified interconnection process is included for projects up to 100 kW in size. More information about New Hampshire’s residential solar PV electric utility interconnection requirements is presented in the next section of this Guide.

#### ***Did you know?***

*Coordinating with your local utility to ensure the safe electrical interconnection of a residential solar PV system is simple but important. Don’t wait until mid-installation to start.*

---

<sup>18</sup> <http://www.planning.org/research/solar/briefingpapers>

<sup>19</sup> <http://www.planning.org/pas/infopackets/open/eip30.htm>.

<sup>20</sup> <http://www.puc.nh.gov/Regulatory/Rules/PUC900.pdf>.

### III. RESIDENTIAL ROOFTOP SOLAR PV STRATEGIES

This section provides information on steps that individual New Hampshire municipalities can take to maximize the efficiency and effectiveness of their procedures for review and permitting of residential rooftop solar PV.

- Make permitting information easily accessible and available to homeowners and installers
- Simplify permit application, submission, review and inspection processes
- Understand interconnection requirements
- Pursue training and other resources

More information on each of these strategies is presented below, along with sample permit templates and checklists included as Appendices to this Guide. This guidance supports the goal of reducing the soft costs of residential solar PV by streamlining the application and permitting processes, and increasing the availability of information regarding solar PV for both homeowners and municipalities.<sup>21</sup>

New Hampshire municipalities are encouraged to consider this guidance to support efficient and safe residential rooftop solar PV installations in their communities. As with everything contained within this Guide, not all suggestions will be relevant or ideal for all communities and customization may be necessary.

#### MAKE PERMITTING INFORMATION AVAILABLE

The following strategies are identified as ways New Hampshire communities can make permitting related information more easily available.

##### 1. REVIEW AND DOCUMENT THE EXISTING PERMITTING PROCESS

If a permit is currently required for solar PV installations, or if such a requirement is determined appropriate for residential rooftop solar PV, consider creating a simple permit checklist for applicants to follow that defines the municipality's specific processes and permit requirements. The checklist should identify filing requirements, fees and appropriate community staff and contact information, along with anticipated time frames for submittal and review. A Sample Permit Checklist is provided in Appendix A and can be easily modified and customized (adding or deleting items) to meet the requirements of individual towns. If your municipality currently has no permitting requirement for residential rooftop solar PV, then make that information easily known to municipal staff, residents and installers.

#### ***Did you know?***

*A permit checklist can help applicants understand what is needed to receive approval to install a residential solar PV system. A checklist should reflect the regulatory process in place in your city or town, and identify points of contact and associated costs.*

---

<sup>21</sup> Though our team arrived at these strategies independently from other teams across the country, these themes are consistent with the work of other teams throughout the nation that are working to help understand and improve permitting processes associated with residential solar PV.

## 2. PROVIDE RESOURCES ON MUNICIPAL WEBSITES

Making information and resources pertaining to your residential solar PV permitting process and fees available and easily accessible on your town's website helps residents and businesses seeking to invest in solar in your city or town. If permit forms can be accessed and submitted online with the necessary documentation, along with electronic payment options or by mail, time and costs associated with the permitting phase of solar PV projects could be reduced. Simply posting forms online and accepting PDF or scanned copies of applications would be a great help to many solar installers and homeowners.

## SIMPLIFY PERMIT APPLICATION, SUBMISSION, REVIEW AND INSPECTION PROCESSES

Municipal permitting staff and inspectors make sure standards and codes are met to protect people, property, homes and businesses. Nevertheless, municipal staff could consider ways to make residential rooftop solar PV permit application, review and inspection processes easier without compromising safety. The following measures and strategies are suggestions for adding efficiency to these processes, when a town believes such processes are necessary.

### 1. PERMIT APPLICATION

The following strategies have been identified as ways New Hampshire cities and towns can make the application process easier for potential applicants.

#### 1.1. DEVELOP AND ADOPT A STANDARD PERMIT SPECIFICALLY FOR SOLAR PV

In communities where permitting is required for residential rooftop solar PV, it could be beneficial to move toward a specific permit specifically designed for solar PV. This will make the process clearer for both installers and homeowners. A copy of the Sample Permit Application for NH Residential Solar PV is included in this Guide as Appendix B. It is also posted and available for download on the OEP web site (<http://www.nh.gov/oep/>). This permit application was developed through a review of best practices and is targeted for residential rooftop solar PV. For larger (typically commercial) systems, a town may require more information and a different permitting process. It can be easily modified and customized (adding or deleting items) to meet the requirements of individual towns.

The Permit Application for Residential Solar PV contains the following components:

- ✱ A two-page permit application form.
- ✱ A two-page instruction document including a list of suggested information to be provided on the application attachments/drawings.
- ✱ Three sample drawings—electrical one-line, one-line site plan and attachment details

#### ***Did you know?***

*Adopting a standard permitting form would eliminate guesswork for municipal staff, homeowners and installers; clarify and simplify review and inspection; save everyone time and cost; and help make clean energy more affordable for your residents.*



- ✱ A Structural Review Worksheet that can be used to evaluate the adequacy of a roof structure for solar PV, such as the sample attached here as Appendix C.

Towns are encouraged to make modifications to the sample forms to best meet community needs. For example, additional information may be required, or some information may be deemed extraneous and removed.

### 1.2. REDUCE OR WAIVE PERMITTING FEES

In communities where permitting is required for residential rooftop solar PV and a flat fee does not already exist, it could be beneficial to move toward a flat fee rather than charging based on the cost of the project. This will make the process simpler and more affordable for both installers and homeowners.

### 1.3. MAKE REQUIREMENTS AND PROCESSES AS TRANSPARENT AND CLEAR AS POSSIBLE

When installers and homeowners know what to expect, they are more likely to get it right the first time with frustrations minimized for all.

- ✱ As suggested, consider posting a summary of your residential rooftop solar PV permitting, application and inspection process (checklist) clearly marked on your town or city's webpage.
- ✱ If you have multiple pages on your town's website, consider adding a clean energy webpage for your Permitting Department. There are many tools available to help with creation of a simple web presence, and you could link to it from your town's homepage.

## 2. PERMIT SUBMISSION

The following strategies have been identified as ways New Hampshire communities can make submitting a permit easier for applicants.

### 2.1. CONSIDER PROVIDING INFORMATION ABOUT YOUR REQUIREMENTS THROUGH ONLINE PERMITTING <sup>22</sup>

For example as a downloadable, informational document, you could provide a link to your online permitting system from your town's homepage and/or permitting webpage.

- ✱ Online permitting enables applicants to obtain and submit solar PV permit application materials online and can make it easier for your town to process and keep track of permits. You could also allow installers to obtain and *submit* permit application materials through your existing website, by email or by regular mail. Offering these options for application submission will save applicants time and money.

### 2.2. ALLOW (IF ABLE) INSTALLERS TO PAY PERMIT FEES ONLINE, ELECTRONICALLY, OR BY REGULAR MAIL

This would help them save on driving time and cost, allowing them to do more business with your community.

---

<sup>22</sup> For examples, see: Simply Civic, [simplycivic.com](https://www.simplycivic.com); City View, [msgovern.com/software/cityview](https://msgovern.com/software/cityview); View Permit, [viewpermit.com](https://viewpermit.com).

### 3. REVIEW AND INSPECTION PROCESSES

The following strategies have been identified as ways New Hampshire cities and towns can make the regulatory review and inspection process predictable and easy to navigate.

#### 3.1. STRUCTURAL REVIEW

***Develop criteria and a methodology for determining when professional structural engineering reviews are not necessary, without compromising safety:*** It would be beneficial to adopt a standard structural evaluation worksheet that can be submitted with the other permit materials. This would document the specific structural components and proposed modifications planned to support the proposed solar array. Using the sample Structural Review Worksheet provided in Appendix C of this Guide as part of the PV permitting process could help identify homes which need professional structural review and eliminate the requirement that all homes have that level of review. The Worksheet would create a standard process for evaluating structures with regular roof framing and help determine whether documentation prepared and stamped by a Registered Design Professional (RDP) may be required.

- ✱ While rooftop solar PV systems typically weigh less than a second layer of roof shingles and a majority of homes are designed to support this weight, there are some circumstances when a roof structure needs to be improved upon or reinforced to safely support a solar PV system. Many New Hampshire towns require a review and wet stamp from an RDP to verify that an existing home or building can support solar PV without additional reinforcement. The employment of an RDP can add to project costs. To find alternatives to the employment of an RDP on every project without sacrificing safety, a sample Structural Review Worksheet for Residential Rooftop Solar Energy Systems has been compiled. A copy of this sample Structural Review Worksheet is included in this Guide, as Appendix C, for potential use by qualified reviewers to evaluate the adequacy of a residential roof framing structure for solar PV. The sample Worksheet does not replace applicable municipal, state or federal permitting or review requirements and may be used formally only if expressly authorized for use by the controlling municipality.

Use of this sample Structural Review Worksheet might only be appropriate for use on homes with common structural features, and where it is possible to see the framing to identify:

- Rafter size and spacing
- Ridge board vs. ridge beam
- Configuration of framing, including:
  - Cross ties at eave vs. collar ties;
  - Collar tie locations, if present (spacing and height);
  - Collar tie connections, if present.
  - Whether any framing irregularities (e.g. skylights, dormers) occur in the vicinity of the proposed PV panels.
  - Type of roof sheathing (e.g. plywood, OSB, straight board sheathing)

If too much of the framing is concealed by finishes, such as in spaces with cathedral ceilings, it may be necessary to have an RDP investigate the framing and review the proposed installation, especially if openings need to be made in the finishes to observe the framing and document the construction details listed above.

The sample Structural Review Worksheet requires the applicant (or the installer) to provide detailed roof framing information to assess whether the roof structure meets all the Worksheet's criteria. If the structure meets all of the criteria and no indications of structural flaws are present, the installer must then perform and provide results from roof load calculations to evaluate whether the roof can support a solar PV system.

The sample Structural Review Worksheet addresses the most common structural concerns that arise with solar PV (e.g., dead load, wind load), and flags any aspects of the structure that could necessitate further professional review. Specifically, the worksheet addresses dead load and wind load concerns by ensuring the proposed solar installation meets the following criteria:

1. The distributed load (i.e., weight of PV system on roof) is less than four (4) pounds (lbs) per square foot (ft<sup>2</sup>).
2. The point load (i.e., weight of PV system at each attachment/mounting point) is less than 45 lbs.
3. The roof's maximum rafter span can support the weight of the PV system with a designated snow load (in lbs).
4. The solar panels are parallel to the roof and there is no more than a 6 inch gap between the panels and the roof surface, to ensure wind uplift is minimized.

The installer completing the Worksheet should have experience identifying structural features. Some suggested qualifications and uses of the worksheet are provided below. However, final decision on specifically who can use the worksheet and how it is used is left up to the municipality.

- ✱ A municipality could allow an approved reviewer, with a specific certification, to submit this form in lieu of a structural review by a registered design professional. This would need to be authorized by the municipality. Therefore, installers should not use the worksheet to replace evaluation by a registered design professional unless specifically authorized to do so by the municipality. Potential, acceptable certifications a jurisdiction could consider authorizing are:
  - North American Board of Certified Energy Practitioners (NABCEP) PV Installation Professional certification.
  - Registered Professional Engineer.
  - Engineer-in-Training (EIT).
  - Other approved certification that requires training in the structural inspection of residential framing systems.
- ✱ If a municipality requires a structural review by an RDP on every rooftop solar PV project, its own customized and formally approved Structural Review Worksheet or information provided on portions of the Worksheet could be submitted as supplemental information along with a letter from the RDP.
- ✱ An installer could use the sample Structural Review Worksheet to help him/her identify "red flags" and provide other information that would be useful to share directly with a registered design professional. This

preliminary or extra information could help the RDP find issues more easily, potentially reducing the amount of time needed by the professional.

- \* An RDP may choose to utilize the sample Worksheet as part of his/her evaluation process.

### 3.2. INSPECTION PROCESS

***Simplify the Inspection Process:*** Consider ways your municipality could organize and combine necessary inspections.

- \* Most residential rooftop solar PV systems can be evaluated with a single comprehensive inspection. Multiple inspections and scheduling appointments with large windows-of-time can be difficult for installers and property owners seeking to install solar PV.
- \* If scheduling specific appointment times is not feasible for your town, consider narrowing the window of time specified for inspections. This saves everyone – and ultimately town residents and business owners – time, money and frustration.

***Simplify other processes and steps wherever possible:***

- \* Communities that require licensed professionals to appear in person to file for a permit could consider streamlining the process by no longer having such a requirement. Moving to an online permitting system could address this, reduce costs overall and be more convenient.
- \* Shorten Permit Approval Times: Permitting delays increase the cost for all involved in a solar PV installation. Consider issuing permits in as short a time frame as possible, for example on the “same day” or “over-the-counter” for small-scale rooftop solar PV systems that clearly meet your jurisdiction’s permit approval criteria.
- \* Consider having one department responsible for permitting residential rooftop solar PV to make the process easier for everyone. Asking an installer to visit or obtain signatures from multiple departments can cause confusion, cost extra time and money, and can discourage installers from doing business in your city or town. A single responsible department can reduce the number of steps and extra requirements asked of installers and can also simplify the process for your municipality and reduce overall workload for staff.
  - In larger communities it would help if there was one contact person for all aspects of a residential solar PV permit. In some of NH’s larger communities there are several code officials with specific areas of responsibility. It is common in situations like this for an installer to need to coordinate with each person for portions of the permitting process. Identifying one staff person to act as the point person on solar PV installations in combination with online permitting could greatly reduce the time and associated labor costs.
- \* Recognize that new construction can be designed and built to be solar-ready, and this may become more prevalent as new laws and building codes are adopted. Example characteristics of solar-ready, new construction are:<sup>23</sup>

---

<sup>23</sup> NREL has published a useful report on this topic called “[Solar Ready Buildings Planning Guide](#).”

- The roof is capable of carrying the load of solar PV equipment up to a specified amount such as four (4) pounds (lbs) per square foot, as well as be designed to withstand local wind and snow loads.
- The roof is free from obstructions such as plumbing vents.
- Building plans include a chase, or a means to connect the solar PV system to the building's electrical system.
- There is space near the electrical panel for inverter and disconnect boxes.

## UNDERSTAND NH'S RESIDENTIAL SOLAR PV ELECTRIC UTILITY INTERCONNECTION REQUIREMENTS

Homeowners interested in installing solar PV systems on their property (rooftop or ground mounted) while maintaining an electrical connection with the local electric utility must be aware of and adhere to strict utility interconnection standards and regulatory-approved requirements.<sup>24</sup> These requirements exist to ensure the continued safety and protection of both the homeowner's PV system and the utility's electrical grid. In Appendix D, a summary of the utility interconnection (net metering) and application process has been included for customer-owned residential solar PV systems. This includes inverter-based installations and other renewable generation projects up to 100 kW.

The simplified interconnection (net metering) application process:

- ✱ Provides for streamlined approval for inverter-based systems.
- ✱ Includes readily accessible application forms and instructions through direct download from NH utilities' web sites:
  - [Eversource](#)
  - [Unitil](#)
  - [Liberty](#)
  - [NH Electric Coop](#)

Although each utility's application form is slightly different in appearance, key elements include: Applicant Information, Generating Facility Information, Installation Information, and Signatures and Certification Information.




---

<sup>24</sup> NH Public Utilities Commission Rule 900: Net Metering for Customer-Owned Renewable Energy Generation Resources of 1,000 Kilowatts or Less, establishes reasonable interconnection requirements for safety, reliability and power quality for net energy metering as the public interest requires, and consistent with the legislative declaration of purpose set forth in RSA 362-A:1 – see PUC 901.01. A simplified interconnection process is included for projects up to 100 kW in size.



***Key items to be aware of when navigating through the New Hampshire utility's electrical interconnection process include:***

- \* *The process is simple, but important. Don't wait until mid-installation to start.*
- \* *Homes with multiple meters, or sub-meters cannot be combined under a single "net meter."*
- \* *Visible disconnect switch and labeling is required. These requirements are in addition to a recent (2014) National Energy Code requirement for a rapid disconnect switch that must be located on the rooftop within 6 feet of the PV system.*
- \* *Certificate of Completion must be signed by a town designee or electrician.*
- \* *Properly permitted, installed and inspected systems should not be "energized" until a "net meter" is installed by the interconnecting utility. Without a "net meter", all generation from the PV system that is fed back into the utility grid will be recorded as energy usage at the home, instead of as an offset to the homes actual energy usage.*
- \* *Under certain circumstances, the existing transformer serving a home's load where a PV system is installed may need to be upgraded to maintain grid system reliability. Such replacement is typically performed at the customer/homeowner's expense.*

Before submitting an interconnection (Net Metering) application to your local electric utility, it is highly recommended that you review Chapter PUC 900 of the New Hampshire Code of Administrative Rules – Net Metering for Customer-Owned Renewable Energy Generation Resources of 1,000 Kilowatts or Less – which can be found at <http://www.puc.nh.gov/Regulatory/Rules/PUC900.pdf>.

## PURSUE TRAINING AND OTHER RESOURCES

It is recommended that municipal staff involved in solar PV permit review and inspection participate in relevant solar PV training. Trained personnel know what to look for, and can help alleviate frustration and work for municipalities, installers and property owners. Municipal staff may access free training courses online and find other resources on the OEP website.<sup>25</sup>

- \* Building inspectors, along with other staff could access the latest resources and documentation about how to inspect solar PV systems efficiently and effectively. The following resources pertain specifically to inspections:
  - [“Photovoltaic Online Training for Code Officials”](#) developed by IREC and conceived in partnership with the U.S. Department of Energy, offered on the National Training & Education Resource (NTER) website.
  - [“Field Inspection Guidelines for PV Systems”](#) from the International Renewable Energy Congress (IREC).

In addition to the training and resources identified above, there are many resources available to both individuals and communities, to educate themselves on Solar PV permitting, zoning, interconnection and more. Some of the most pertinent resources are included below:

- \* [American Planning Association essential information packets on solar PV](#). A variety of information on both residential and commercial solar zoning considerations.
- \* [Solar Energy International](#) offers workshops on solar PV as well as a variety of textbooks in eBook format and print editions.
- \* Sandia National Laboratories has put together “photovoltaic guide post,” [multimedia tutorials for code inspectors](#).
- \* “NABCEP Photovoltaic (PV) Installation Professional Resource Guide,” version 6, authored by William Brooks and James Dunlop, published 2013 by the North American Board of Certified Energy Practitioners (NABCEP), is available as a PDF download free of charge on the [NABCEP website](#).
- \* [California Solar Permitting Guidebook](#) – Similar to this document, but much broader in its scope and provides detailed background on the process of solar installation.
- \* IREC’s [Solar Instructor Training Network](#)
- \* IREC’s May 2012 report [“Sharing Success. Emerging Approaches to Efficient Rooftop Solar Permitting,”](#) is a summary of best permitting practices across the country.
- \* IREC’s [Permitting home page](#)

---

<sup>25</sup> Photovoltaic Online Training For Code Officials: [nterlearning.org/web/guest/course-details?cid=402](http://nterlearning.org/web/guest/course-details?cid=402)

- \* The U.S. Department of Energy developed an updated version of their comprehensive resource: “[Solar Powering Your Community: A Guide For Local Governments.](#)”
- \* [ICLEI](#), Local Governments for Sustainability USA, has posted the slides and recordings from presentations from their 2012-2013 webinar series, “[Reducing Barriers to Solar for Local Governments.](#)” A few examples are:
  - Solar Powering Your Community
  - Addressing Solar Myths and Misconceptions
  - Improving the Efficiency of the Rooftop Solar Permitting Process
  - Firefighter Safety and Photovoltaic (PV) Systems
- \* Resources for Firefighter Safety – As solar PV deployment increases, firefighters may be more likely to encounter a home or business with a solar PV system installed. Training and notification that a PV system is located at a home are two great ways to reduce risk to firefighters. More information about firefighter safety and solar PV is available at the following website.
  - Solar Energy Industries Association (SEIA), “Fire Safety and Solar,” <http://www.seia.org/policy/health-safety/fire-safety-solar>
- \* Incentives and Rebates – New Hampshire PUC website for information on incentives or rebates available for residential PV: <http://www.puc.nh.gov/Sustainable%20Energy/RenewableEnergyRebates-SREG.html>.
- \* DSIRE Database of state incentives for renewables and efficiency. DSIRE is a comprehensive source of information on state, federal, local, and utility incentives and policies that support renewable energy and energy efficiency. <http://www.dsireusa.org/>

